SECOND EDITION

Practical Evidence-based Physiotherapy

Foreword by: Sir Iain Chalmers



Rob Herbert
Gro Jamtvedt
Kåre Birger Hagen
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Practical Evidence-Based Physiotherapy



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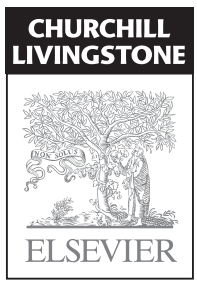
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Foreword

A few years ago, I wrote an article about what I want from health research when I am a patient (Chalmers 1995). I tried to make clear that I want decisions about my care to be based on reliable evidence about the effects of treatments. I can't imagine that many patients or health professionals would suggest that this is an unreasonable wish, but they might well vary quite a lot in what they regard as 'reliable evidence'.

I illustrated the issue by noting that, after about five treatments from a chiropractor to whom she had been referred by her general practitioner, my wife believed that she had reliable evidence that chiropractic could help relieve her chronic shoulder and back pain. By contrast, although I was delighted that her longstanding symptoms had subsided, I noted that I would begin to believe in the benefits of chiropractic when a systematic review of the relevant controlled trials suggested that it could be helpful.

Sometimes the effects of treatments are dramatic, as they had been for my wife. For example, after my general practitioner referred me for physiotherapy for a very painful right shoulder injury, the experienced physiotherapist tried a number of technological approaches using some impressive-looking kit; nothing seemed to be helping. Then she decided to treat my right supraspinatus tendon with what I understand are called Cyriax's frictions. The relief was instantaneous and dramatic, and I needed no persuasion that it was as the result of the treatment.

If treatments never did any harm and were universally available in unlimited variety and supply, basing decisions in health care on the individual experiences of patients and professionals would not present any problems. But treatments do have the capacity for doing harm. Chest physiotherapy in very low birthweight infants, for example, came under suspicion of causing brain damage (Harding et al 1998). Even though doubt remains as to whether the associations observed at the time reflected an adverse effect of neonatal physiotherapy (Knight et al 2001), it would have been reassuring if it had been possible to point to a strong evidence base justifying the use of physiotherapy in these fragile infants. Even if treatments don't harm the people for whom they are prescribed, if they don't do any good they use limited resources that could be deployed more profitably elsewhere.

I don't know how frequently physiotherapy has dramatic effects. But if it is anything like medical care, dramatic effects of treatment are very rare. In these circumstances, it is important to assess whether particular forms of care are likely to do more good than harm, and this entails doing carefully designed research.

A decade ago, I sustained a fractured fibula while on holiday in the USA. The orthopaedic surgeon there advised me that, when the swelling had subsided after my impending return to the UK, I would have a plaster cast applied for 6 weeks. Two days later a British orthopaedic surgeon said that the advice that I had received was rubbish, and that I was to have a supportive bandage and to walk on the ankle until it hurt, and then some more! When I asked whether I might be entered into a randomized trial to find out whether he or his 'colleague' across the Atlantic was correct, he told me dismissively that randomized trials were for people who were uncertain whether or not they were right, and he was certain that he was right!

Several questions were posed in the account of this experience published in the *Journal of Bone and Joint Surgery* (Chalmers et al 1992). Which of these orthopaedic surgeons was right? Were they both right, but interested in different outcomes of treatment? What were the consequences, in terms of short- and long-term pain and function (and the costs of treatment), of acquiescing in the advice of the second rather than the first? And what was known about the effects of the various forms of physiotherapy that were subsequently prescribed (Chalmers et al 1992)? In the decade since that experience there has been a welcome increase in the likelihood of patients and professionals obtaining answers to questions like these, and this impressive new book constitutes an important milestone in these developments.

Reliable identification of the modest but worthwhile effects of physiotherapy poses a substantially greater challenge than reliable evaluation of the

effects of most drugs and some other forms of health care. Not only is it often difficult to characterize physiotherapy interventions in words that allow readers to understand what was done, but taking account of the social and psychologically mediated effects of physiotherapists themselves may also pose interpretive conundrums. I remember being impressed by the results of a randomized comparison of routine instruction for post-natal pelvic floor exercises with personal encouragement from a physiotherapist, done by colleagues in a unit where I worked at the time (Sleep & Grant 1987). No differences were detected in the frequency of urinary or faecal incontinence between the two groups of women 3 months after delivery, but those who had received personal advice and encouragement from the physiotherapist were less likely to report perineal pain and feelings of depression.

Physiotherapists who recognize that they have a professional responsibility to do their best to ensure that their treatments are likely to do more good than harm, and that they are a sensible use of limited resources for health care, will find that *Practical Evidence-Based Physiotherapy* is a veritable goldmine of useful information. I am confident that next time I am referred for physiotherapy this book will have helped to ensure that I will be offered treatment that is likely to be good value for both my time and my taxes.

Sir Iain Chalmers

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Preface to the first edition

How does it come to happen that four physiotherapists from three countries write a book together? We first met at the World Confederation of Physical Therapy's (WCPT) Expert Meeting on Evidence-Based Practice in London in 2001. By then we knew of each other's work, but at that meeting we discovered kindred spirits who had been thinking about similar issues, albeit from quite different perspectives.

We had all been thinking and writing about evidence-based practice. Judy Mead had co-edited and co-authored the first textbook on evidence-based health care in 1998 (Bury & Mead 1998). Kåre Birger Hagen and Gro Jamtvedt were working on a Norwegian textbook on evidence-based physiotherapy (subsequently published as Jamtvedt et al 2003). And Rob Herbert and his colleagues at the Centre for Evidence-Based Physiotherapy had launched the PEDro database on the internet late in 1999. Together we had been teaching skills of evidence-based practice, carrying out clinical research and advising health policy makers. The ground had been laid for collaboration on a text with a broader perspective than any of us could write on our own.

The catalyst for the book was Heidi Harrison, commissioning editor at Elsevier. During the WCPT Congress at Barcelona in 2003, Heidi twisted eight arms and extracted four commitments to the writing of this book. We are grateful to Heidi for getting us started, and for providing ongoing support over the year that it took to write the book.

Is there a need for another textbook on evidence-based practice? We think so. Few textbooks on evidence-based practice have been written with physiotherapists in mind. This book considers how physiotherapists can use clinical research to answer questions about physiotherapy practice. In that respect at least we think this book is unique.

We hope this book can meet the needs of a diverse readership. We want it to provide an introduction to the skills of evidence-based practice for undergraduate students and practising physiotherapists who have not previously been exposed to the ideas of evidence-based practice. Throughout the book we have highlighted critical points in the hope that those who are new to these ideas will not 'lose the forest for the trees'. We also hope to provide a useful resource for those who already practise physiotherapy in an evidence-based way. We do that by providing a more detailed presentation of strategies for searching for evidence, critical appraisal of evidence, and using clinical practice guidelines than is available in other texts. We have gone beyond the boundaries that usually encompass texts on evidence-based practice by considering how evidence about feelings and experiences can be used in clinical decision-making. There is an extensive use of footnotes that we hope will stimulate the interest of advanced readers.

Some books are great labours. This one was exciting, challenging and fun. It has been a shared process in which all contributed their different perspectives. We have discussed, struggled with difficult ideas, resolved disagreements, and learned a lot. We also learned about each other and became good friends. For two wonderful weeks we met and worked together intensively: first in the snowy mountains of Norway in mid-winter, and later in a quiet village near Oxford in spring.

We would like to thank the people who reviewed part or all of the manuscript and gave useful feedback. They are, in alphabetical order, Trudy Bekkering, Mark Elkins, Claire Glenton, Mark Hancock, Hans Lund, Sue Madden, Chris Maher, Anne Moore, Anne Moseley and Cathie Sherrington. All remaining shortcomings are our own.

Rob Herbert, Gro Jamtvedt,
Judy Mead and Kåre Birger Hagen, 2005

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Preface to the second edition

Since the first edition of *Practical Evidence-Based Physiotherapy* was published 5 years ago there have been many changes in the profession of physiotherapy. Remarkably, the number of published reports of randomized trials has more than tripled (from 4100 in July 2004 to 13 700 in August 2010), as has the number of systematic reviews of randomized trials (from 780 to 2500 over the same period). Commensurate increases have occurred in the volume of reports of qualitative research studies, cohort studies and cross-sectional studies of diagnostic test accuracy relevant to the practice of physiotherapy. This has been accompanied by an increase in the quality of research, demonstrably so in the case of randomized trials (Moseley et al, in press). The huge increase in volume and relatively modest increase in quality of clinical research means that now, more than ever before, it is possible to inform the practice of physiotherapy with high-quality clinical research.

There have also been other changes relevant to the practice of evidence physiotherapy. Our impression is that there is now a healthier, less antagonistic and more co-operative relationship between those interested in quantitative and qualitative research. Electronic access to full-text journals has improved, particularly in developing countries, although it is still less than satisfactory for many physiotherapists. There has been a growing interest in using 'clinical prediction rules' to identify those patients most likely to benefit from intervention. (Unfortunately much of the discussion around this issue ignores the extensive earlier literature on subgroup analyses in medical trials.) Another area of growing interest has been the development of methods for determining how big the effects of interventions must be for recipients of care (patients) to perceive that intervention is worthwhile. We anticipate that, in the long run, this will have a big impact on which interventions physiotherapists choose to offer to their patients. Important contributions have been made to discussions about the nature, extent and significance of placebo effects, the role of blinding in randomized trials, and methods of appraising quality of trials of complex interventions. There has been a growth in 'implementation research' that investigates the effectiveness of strategies for translating findings of high-quality research into clinical practice. And there have been substantial methodological advances, notably into methods for dealing with missing data, repeated measurements in clinical trials, and meta-regression techniques.

The second edition of *Practical Evidence-Based Physiotherapy* incorporates discussion of most of these emerging issues. References and examples that had become anachronistic have been replaced with more contemporary references and examples. A new chapter (Chapter 8) discusses when and how new interventions should become routine clinical practice.

Writing books can be hard work, but it's not all hard. In a tradition established with the first edition, the authors spent an idyllic week working together in a rustic cottage in an olive grove in rural Tuscany. Once again we were able to discuss intricacies of evidence-based practice and enjoy the pleasure of each other's company.

We thank Rita Demetriou-Swanwick and Ailsa Laing from Elsevier for their support and assistance. Ingvild Kirkehei, a librarian at the Norwegian Knowledge Centre for the Health Services in Oslo, Norway, updated the chapter on searching for evidence (Chapter 4). We are grateful for the great care with which she checked and updated content, and for her thoughtful and substantial contributions to that chapter.

Rob Herbert, Gro Jamtvedt,
Kåre Birger Hagen and Judy Mead
September 2010

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Evidence-based physiotherapy: what, why and how?

1

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OVERVIEW

Evidence-based physiotherapy is physiotherapy informed by relevant, high-quality clinical research. The *practice* of evidence-based physiotherapy should involve integration of evidence (high-quality clinical research) with patient preferences and practice knowledge. This chapter provides a brief outline of the history of evidence-based health care and argues that clinical practice should be evidence-based wherever high-quality clinical research is available. A five-step process for practising evidence-based physiotherapy is described. This process provides a framework for the rest of the book.

What is 'evidence-based physiotherapy'?

The aim of this book is to provide physiotherapists with a practical guide to evidence-based physiotherapy. What is 'evidence-based physiotherapy'?

> Evidence-based physiotherapy is physiotherapy informed by relevant, high-quality clinical research.

This implies that when we refer to 'evidence' we mean high-quality clinical research.

Our definition of evidence-based physiotherapy differs from earlier definitions of evidence-based physiotherapy and evidence-based health care. Previous authors considered that practice was evidence based when it involved the use of the *best available* evidence (Bury & Mead 1998, Sackett et al 2000). The best available evidence might be high-quality

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clinical research, but where high-quality clinical research is not available the best available evidence could consist of poor-quality clinical research, consensus views or clinical experience. That is, according to earlier definitions, evidence-based practice could be practice based on poor-quality clinical research, consensus views or clinical experience. We recognize that there is often insufficient relevant, high-quality research to inform clinical decisions and that, when this is the case, decisions still need to be made. Sometimes best practice can be informed only by poor-quality clinical research, consensus views or clinical experience. However, in our view, such practices cannot be considered to be evidence based. The term 'evidence-based physiotherapy' should be reserved for physiotherapy that is based on high-quality clinical research.

A premise of this book is that, wherever possible, clinical decisions should be informed by high-quality clinical research. This does not mean that clinical decisions should be informed *only* by high-quality clinical research. Good decisions must take into account patients' expectations, desires and values (patient 'preferences'; Haynes et al 2002). In addition, experienced health professionals can use past experiences and procedural knowledge ('practice knowledge'; Higgs et al 2004) to inform clinical decision-making.

> Wherever possible, clinical decisions should be informed by high-quality clinical research, but never just by clinical research. Good clinical decisions, whether evidence based or not, should involve consideration of patient preferences and therapists' practice knowledge.

What do we mean by 'high-quality clinical research'?

The term clinical research is usually used to mean research conducted on patients in clinical settings.[1] Clinical research is empirical in nature, which means that it uses experiment or observation rather than theory to generate knowledge.

An enormous amount of clinical research has been conducted, but not all clinical research is of high quality. High-quality clinical research distinguishes itself from low-quality research by being designed, conducted and reported in a way that allows us to trust the results. That is, high-quality research is that which can be expected to have a low risk of bias.[2] In reality, much clinical research is of neither a very high nor a very low quality; most research is of high quality in some respects and of low quality in others. A degree of judgement is needed to determine whether a particular piece of research is of sufficiently high quality to inform clinical decision-making.

What do we mean by 'patient preferences'?

The traditional model of clinical decision-making has been one in which physiotherapists make decisions about therapy for their patients. In recent years there has been greater consumer involvement in decision-making and now many patients expect to be given an opportunity to contribute to, and share, decisions involving their health (Edwards & Elwyn 2001). In contemporary models of clinical decision-making, patients are encouraged to contribute information about their experiences and values – what it is that matters most to them. In this way patient 'preferences' can inform decision-making. There has been a move away from the situation in which the physiotherapist or doctor alone makes decisions for the patient, towards a situation in which the patient and the physiotherapist or doctor make shared decisions. Some patients do not like intervention and would consider intervention to be worthwhile only if it conferred very large beneficial effects, whereas other patients would like to have intervention even if the effects were very small. Therefore decisions about the acceptability of an intervention need to be negotiated with each individual patient. Each patient needs to be told of the expected effect of intervention and asked whether they feel that effect is large enough that they would choose to have the intervention This is an important cultural change. It requires that physiotherapists exercise communication skills, empathy and flexibility needed to communicate to patients the risks and benefits of alternative actions.

[1]Clinical research may not always be carried out on patients. It could include in-depth interviews with carers, for example. Similarly, the setting may not always be clinical – the research may be conducted in patients' homes or other community environments, or it may involve public health activities such as community-based health promotion programmes.

[2]One definition of bias is a systematic deviation from the truth.

What do we mean by 'practice knowledge'?

Practice knowledge is knowledge arising from professional practice and experience (Higgs & Titchen 2001). Consciously or subconsciously, physiotherapists add to their personal knowledge base during each patient encounter. This knowledge is used on a day-to-day basis, along with other sources of information such as high-quality clinical research, to inform practice. Practice knowledge 'underpins the practitioner's rapid and fluent response to a situation' (Titchen & Ersser 2001). It is what differentiates well-educated new graduates and experienced physiotherapists.

Practice knowledge is not 'evidence' as we have defined it. Nonetheless, practice knowledge should always be brought to the decision-making process, and sometimes practice knowledge should dominate evidence. For example, there is some evidence that upper extremity casting can increase the quality and range of upper extremity movement for children with cerebral palsy (Law et al 1991). However, an experienced physiotherapist might suggest alternative interventions for a particular child if his or her practice knowledge suggested that casting would cause that child distress, or if the child or the child's parents were unlikely to tolerate the intervention well.

Additional factors influencing clinical decisions

We have discussed how good clinical decision-making involves integration of high-quality clinical research, patient preferences and practice knowledge. But other factors can also influence decisions. Good practice is responsive to a range of contextual factors.

The availability of resources often influences clinical decisions. For example, the most effective intervention for a particular problem could require large amounts of staff time or an expensive piece of equipment that is not available, in which case a less effective intervention might have to be used. Another resource to be considered may be the skills of the physiotherapist. In making shared decisions about an appropriate intervention, physiotherapists need to judge whether they have the skills and competence needed to provide treatment safely and effectively. If not, it might be appropriate to refer the patient to another physiotherapist who does have the necessary skills and expertise. Consideration might also need to be given to whether services are available in other settings (for example, in the community instead of a hospital) and, if there is a choice, which setting would provide the greater benefit for the patient.

If we look at physiotherapy from a global perspective we can see huge variations in the spectrum of conditions that are treated and in the resources provided for health care. Global comparisons of mortality and disability (Murray & Lopez 1997, World Health Organization 2004), perceptions of disability (Üstün et al 1999) and the level of physiotherapy services, clearly show how important these factors are. These regional factors have huge implications for what kinds of patient and problem physiotherapists should be concerned with, and how clinical decisions are made.

In addition, there are important cultural influences that shape how physiotherapy should be practised. Culture affects patient and physiotherapist expectations, attitudes to illness, the provision of health care, communication and patient–physiotherapist interaction, and the ways in which interventions are administered. This means that it might be quite appropriate for physiotherapy to be practised very differently in different countries. We acknowledge that some cultures, particularly those with strong social hierarchies, provide contexts that are less conducive to evidence-based practice or shared decision-making. In multicultural societies physiotherapists may need to be able to accommodate the range of cultural backgrounds of their patients.

The process of clinical decision-making

At the heart of the practice of evidence-based physiotherapy is the process of clinical decision-making. Clinical decision-making brings together information from high-quality clinical research, information from patients about their preferences, and information from physiotherapists within a particular cultural, economic and political context.

Clinical decision-making is complex. Clinical reasoning must be used to analyse, synthesize and interpret relevant information. Evidence, information from patients and practice knowledge must be integrated using professional judgement. 'Clinical reasoning needs to be

seen as a pivotal point of knowledge management in practice, utilizing the principles of evidence-based practice and the findings of research, but also using professional judgement to interpret and make research relevant to the specific patient and the current clinical situation' (Higgs et al 2004: 193). Only when physiotherapy is practised in this way can we 'claim to be adopting credible practice that is not only evidence-based, but also client-centred and context-relevant' (Higgs et al 2004: 194).

While acknowledging the importance of clinical reasoning and the development of practice knowledge, the focus of this book is narrower – we aim to help physiotherapists inform their practice with relevant, high-quality clinical research. Readers who are specifically interested in clinical reasoning and development of practice knowledge could consult Higgs & Jones (2000) and Higgs et al (2004).

Why is evidence-based physiotherapy important?

For patients

A premise of evidence-based practice, though one that is hard to demonstrate empirically, is that practice that is informed by high-quality research is likely to be safer and more effective than practice that is not based on high-quality research. The expectation is that physiotherapy will produce the best possible clinical outcomes when it is evidence based.

Patients are increasingly demanding information about their disease or clinical problem and the options available for treatment. Many patients have access to a wide range of information sources, but not all of these sources provide reliable information. The most widely used source of information is the internet, but the internet provides the full spectrum of information quality. If patients are to make informed contributions to decisions about the management of their conditions, they will need assistance to identify high-quality clinical research.

In some countries, such as the UK, patients' demands for information have been nurtured and encouraged. A number of high-priority government programmes have promoted shared decision-making and choice by providing consumers of health care services access to reliable evidence (Coulter et al 1999, National Institute for Health and Clinical Excellence), and by supporting patients to help each other understand about disease processes (NHS Executive 2001).

For physiotherapists and the profession

Physiotherapists assert that they are 'professionals'. Koehn (1994) argues that a particularly unique characteristic of being a professional is trustworthiness, by which is meant that professionals can be expected to strive to do good, have the patient's best interests at heart and have high ethical standards. A tangible demonstration of a profession's interests in the welfare of its patients is its preparedness to act on the basis of objective evidence about good practice, regardless of how unpalatable the evidence might be. A prerequisite is that the profession must be aware of what the evidence says. Practitioners who don't know whether the evidence indicates that the interventions they offer are effective may have a questionable claim to being 'professionals'. Physiotherapy qualifies as a profession in so far as practice is informed by evidence. And in so far as it is not, there is a risk that physiotherapists will lose the respect and trust of patients and the public at large.

The profession of physiotherapy has changed enormously in the last 60 years. There has been a transition from a role in which physiotherapists did what doctors told them to do to the current role in which, in many countries, physiotherapists act as autonomous or semi-autonomous health professionals. This new-found professional autonomy should be exercised responsibly. With autonomy comes responsibility for ensuring that patients are given accurate diagnoses and prognoses, and are well informed about benefits, harms and risks of intervention.

For funders of physiotherapy services

Physiotherapy should do more good than harm. This is true whether physiotherapy services are funded by the public, through taxes, or by individuals in a fee-for-service or insurance payment. Policy-makers, managers and purchasers of health services have an interest in ensuring value for money and health benefits in situations where health resources are always scarce. Decisions have to be made about where and how to invest to benefit the health of the population

as a whole. Where possible, decisions on investment of health services should be based on evidence (Gray 1997).

History of evidence-based health care

The term 'evidence-based medicine' was first introduced in 1992 by a team at McMaster University, Canada, led by Gordon Guyatt (Evidence-Based Medicine Working Group 1992). They produced a series of highly influential guides to help those teaching medicine to introduce the notion of finding, appraising and using high-quality evidence to improve the effectiveness of the care given to patients (Guyatt et al 1994, Jaeschke et al 1994, Oxman et al 1993).

Why did the term evolve? What were the drivers? There had been growing concern in some countries that the gap between research and practice was too great. In 1991, the Director of Research and Development for the Department of Health in England noted that 'strongly held views based on belief rather than sound information still exert too much influence in health care' (Department of Health 1991). High-quality medical research was not being used in practice even though evidence showed the potential to save many lives and prevent disability. For example, by 1980 there were sufficient studies to demonstrate that prescription of clot-busting drugs (thrombolytic therapy) for people who had suffered heart attacks would produce a significant reduction in mortality. But in the 1990s thrombolytic therapy was still not recommended as a routine treatment except in a minority of medical textbooks (Antman 1992). Similarly, despite high-quality evidence that showed bed rest to be ineffective in the treatment of acute back pain, physicians were still advising patients to take to their beds (Cherkin et al 1995).

Another driver was the rapidly increasing volume of literature. New research was being produced too quickly for doctors to cope with it. At the same time, there was a recognition that much of the published research was of poor quality. Doctors had a daily need for reliable information about diagnosis, prognosis, therapy and prevention (Sackett et al 2000).

One way of dealing with the growing volume of literature has been the development of systematic reviews, or systematically developed summaries of high-quality evidence. Systematic reviews will be discussed in several chapters in this book. In 1992, the Cochrane Collaboration[3] was established. The Cochrane Collaboration's purpose is the development of high-quality systematic reviews, which are now conducted by 52 Cochrane Review Groups, supported by 26 Cochrane Centres around the world. The Collaboration has had a huge impact on making high-quality evidence more accessible to large numbers of people.

One of the early drivers of evidence-based physiotherapy was the Department of Epidemiology at the University of Maastricht in the Netherlands. Since the early 1990s this department has trained several 'generations' of excellent researchers who have produced an enormous volume of high-quality clinical research relevant to physiotherapy. In 1998, the precursor to this book, *Evidence-Based Healthcare: A Practical Guide for Therapists* (Bury & Mead 1998), was published, providing a basic text to help therapists understand what evidence-based practice was and what it meant in relation to their clinical practice. And from 1999 PEDro, a database of randomized trials, has given physiotherapists easy access to high-quality evidence about effects of intervention.

Today, most physiotherapists have heard of evidence-based practice, and evidence-based practice has initiated much discussion and also some skepticism. Some feel the concept threatens the importance of skills, experience and practice knowledge and the pre-eminence of interaction with individual patients. We will discuss these issues further in this book.

How will this book help you to practise evidence-based physiotherapy?

This book provides a step-by-step guide to the practice of evidence-based physiotherapy. The focus is on using evidence to support decision-making that pertains to individual patients or small groups of patients, but much of what is presented applies equally to decision-making about physiotherapy policy and public health issues.

[3]The Cochrane Collaboration was named after Archie Cochrane, a distinguished British epidemiologist who assessed the effectiveness of medical treatments and procedures. More information about Archie Cochrane and the Cochrane Collaboration can be found at http://www.cochrane.org/index0.htm